

631G

Wheel Tractor-
Scraper



Engine

Engine Model	3408E	
Net Power - Gears 1-2	336 kW	450 hp
Net Power - Gears 3-8	365 kW	490 hp
Gross Power - Gears		
1-2	358 kW	480 hp
Gross Power - Gears		
3-8	384 kW	515 hp

631G Wheel Tractor-Scraper

Highly productive earthmoving machines, built to last.

Operator Station

- ✓ Standard enclosed ROPS which features a redesigned cab interior that delivers enhanced operator comfort, efficiency, and productivity. Features include standard air-conditioning, greater legroom, a single lever joystick control, and a redesigned control layout. **pg. 4**

Scraper Bowl

Cellular construction which features a wide cutting edge and a low profile design to optimize loads. **pg. 11**

Electronic Controls

The electronic controls respond to operator commands and input from on-board sensors to optimize machine performance. In addition, the electronic controls provide advanced diagnostic capabilities that result in better machine availability. **pg. 6**

Auger Arrangement

Provides self-loading capability with a Caterpillar designed and manufactured auger system. **pg. 12**

Power Train Features

The power train features an integrated electronic control system which provides continuous communication between the engine, transmission, and operator.

pg. 7

Quick loading, high travel speeds and the ability to load and dump on the run yield fast cycle times, allowing Caterpillar Wheel Tractor-Scrapers to consistently deliver high productivity at the lowest cost per ton.



Power Train

The Caterpillar® 3408E engine with hydraulically actuated, electronically controlled unit injector fuel system and eight-speed power shift transmission combine to form a responsive, highly fuel efficient power train. **pg. 8**

Transmission

Caterpillar planetary powershift transmission design offers greater load carrying capacity than competitive designs by providing a larger contact area between gears. Individual clutch modulation provides fast, smooth shifts and improved serviceability. **pg. 9**

Advanced Modular Cooling System (AMOCS)

✓ Caterpillar exclusive technology improves serviceability and cooling capability. **pg. 10**

Electronically Controlled Cushion Hitch

Accumulator system dampens road shocks, and helps prevent loping, and lock down for precise control. **pg. 13**

Serviceability

Simplified service means more productive uptime. **pg. 14**



✓ *New Feature*

Operator Station

Has been redesigned for enhanced operator comfort, efficiency, and productivity.



Legroom. A new design increases legroom 11%, a full 88.9 mm (3.5 in), and eliminates knee contact points.

Standard Enclosed ROPS. Standard enclosed ROPS with air conditioning enhances operator comfort as well as efficiency.

Multi-Adjustable Seat. The Cat® Comfort Cloth Seat offers comfort with multi-adjustable seat and armrests.

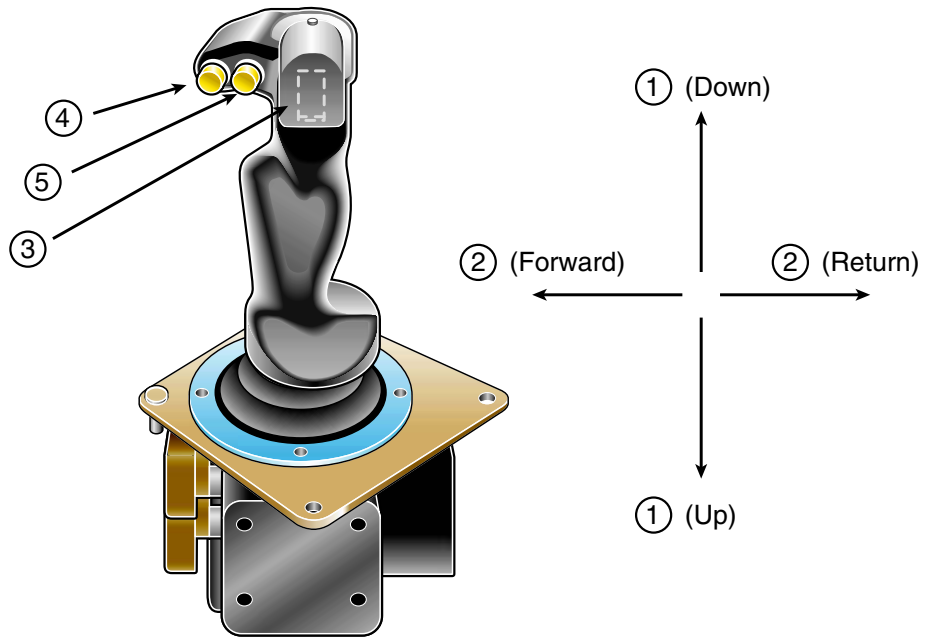
- Swivels and locks in four positions (0° to 30°) providing the optimum operating position in the cut or on the haul.
- Fore/aft and vertical height adjustment to accommodate various sized operators.

Seat Suspension. The new standard seat suspension redefines the ride of scrapers. It features a self contained air compressor with a high performance air shock absorber.

Joystick Controller. Simple and easy to operate, the joystick enhances the productivity of operators of all skill levels. Requires less force to control the critical scraper functions and requires less lever travel.

- 1) Bowl (forward & back)
- 2) Ejector (side to side)
- 3) Apron (thumb rocker switch)
- 4) Transmission Hold
- 5) Cushion Hitch
- 6) Trigger - Auger on/off (not shown - is on front of joystick)

* Standard open bowl does not have a trigger.



Instrument Display Panel. Instrumentation has been relocated for optimal viewing. Real-time performance and diagnostic information is provided through the display panel.

Electronic Monitoring System (EMS). Monitors the machine status and provides real-time information including warnings of problems identified by the EMS.

Ergonomic Switch Layout. Enhances convenience by placing the frequently used switches and indicator lights on the instrument panel, and less frequently used switches on the overhead console.

Throttle Lock Controller. Enhances operation during long haul cycles by allowing the operator to maintain a desired engine speed without maintaining pressure on the throttle.

Standard Air Conditioning. Standard air conditioning system with improved ventilation location enhances airflow in the cab.

Storage And Amenities. Convenient storage location includes space for a lunch box and first aid kit. The cab also has a cup holder as well as an ashtray.

Visibility. The redesigned hood has sloped corners to maintain visibility. The exhaust has been moved to the back of the hood to increase visibility to the right side.

Electronic Controls

The electronic controls respond to operator commands and input from on-board sensors to optimize machine performance. In addition, the electronic controls provide advanced diagnostic capabilities that result in better machine availability.



Air Filter Restrictor Indicator.

Electronic control module monitors air filter restriction and sends a warning message to the electronic monitoring system to alert the operator if the restriction exceeds the allowable limit.

Automatic Ether Injection. Electronic control module activates the ether injection system during engine cranking to enhance cold weather starting.

Automatic Altitude Compensation. At high altitudes the system automatically de-rates fuel delivery as a function of barometric pressure sensed by the system's atmospheric pressure sensor.

Easy Access Diagnostics. Electronic Technician displays real-time pressures, temperatures, fuel settings and diagnostic messages as well as historical information such as engine over-speeds, overheating, low oil pressure, and air filter restriction events.

Fuel Economy. Electronic controls yield a fuel savings by optimizing the timing setting for varying conditions.

Greater Reliability. Caterpillar's HEUI™ fuel system uses hydraulic electronic unit injectors, has fewer moving parts than mechanical unit injection, and requires few adjustments.

Maintenance. With fewer mechanically controlled parts to wear or adjust, the electronic controls reduce maintenance costs and increase machine availability.

Reduced Exhaust Smoke. Utilizing electronic sensors, the optimum air/fuel ratio is precisely controlled by the electronic control module during all segments of the haul cycle. This results in a reduction of smoke and particulates during cranking, starting, and acceleration.

Low Battery Elevated Idle. Electronic control module automatically compensates for low alternator output at low idle to keep the batteries fully charged.

Power Train Features

Electronic controls have been integrated into the power train to provide optimal power delivery, expanded monitoring capabilities, more efficient fuel usage, and reduced emissions.

Integrated Electronics. Electronic controls integrated into the power train monitors the engine, transmission, and operator input.

- Electronic control provides smooth, consistent shifts through the synchronization of engine and transmission speeds.
- Planetary design provides larger contact area between gears than countershaft transmissions for greater load-carrying capacity.

Controlled Throttle Shifting.

Automatically synchronizes engine speed to transmission speed during shifting to reduce power train stress, increase component life, and provide a smoother ride for the operator.

Programmable Top Gear Selection. Top gear selection may be either selected by the operator or downloaded into the MAC-14 controller. Provides the flexibility to match the hauling speed of the fleet to specific job-site needs.

Differential Control. Electronic differential lock on the tractor helps prevent the drive wheels from spinning in poor underfoot conditions. The operator engages the differential lock, prior to wheelspin, with either the left or right foot controls located on the floor of the cab.

Transmission Hold. Allows the operator to maintain the current gear for enhanced control.



Neutral Coast Inhibitor. Prevents the transmission from shifting into neutral if the operator selects neutral while moving faster than 8 kmph (5 mph). Maintains oil to transmission to prevent damage.

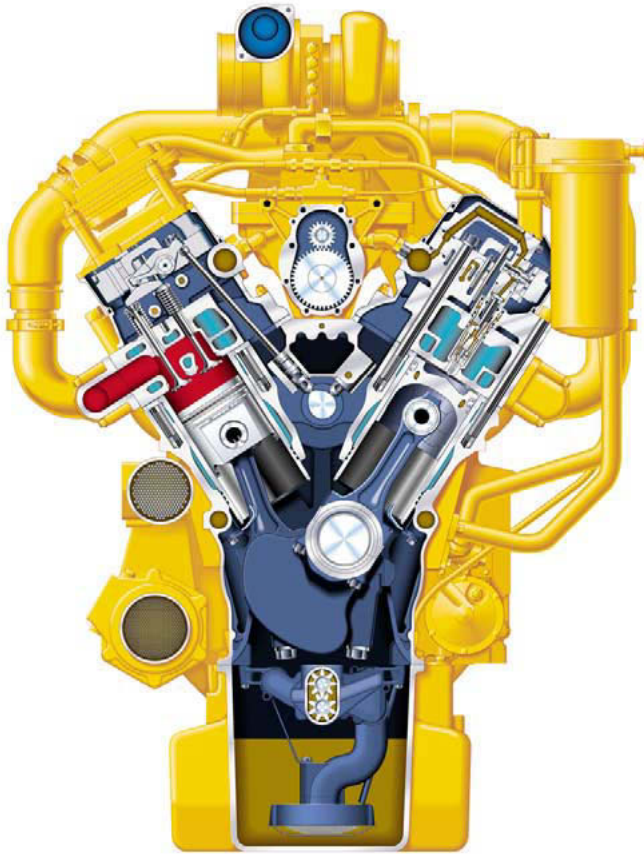
Directional Shift Management. Reduces driveline torque and transmission clutch energy when directional shifts are attempted while the engine is at high rpms.

Final Drives. Outboard-mounted, planetary design final drives reduce torque loads on other drivetrain components while delivering exceptional reliability in the toughest applications.

Braking System. Provides cam-operated expanding-shoe type brakes, independent front and rear circuits, low air pressure audible and visual action alert indicators, and a push-button operated parking brake.

Power Train

Proven components combine to deliver the most durable, reliable power train in the industry, keeping cost low and production high.



3408E Tractor Engine. The engine has the HEUI™ fuel system which uses hydraulically actuated electronically controlled unit injectors. The 3408E diesel engine has dual horsepower capability for the tractor, and provides the power and torque rise for excellent lugging in tough loading conditions.

Dual Horsepower Capability. The electronic engine provides dual horsepower settings, which increases horsepower and provides quicker acceleration on the haul road.



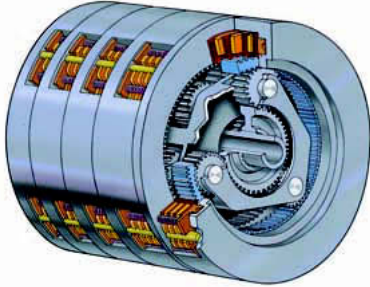
HEUI™ Fuel System. Yields improved fuel economy through more precise fuel delivery and cleaner, more efficient combustion.

Advanced Diesel Engine Management (ADEM) . Utilizes advanced engine management software to monitor, control and protect the engine.

Air To Air After Cooling (ATAAC). Reduces air inlet temperature for enhanced combustion efficiency, reduced emission levels, higher altitude capability, and more power.

Transmission

Integrated electronics allows the machine to monitor the power train which reduces stress as well as provide a better ride to the operator.



Tractor Transmission. The electronically controlled Caterpillar planetary powershift transmission uses proven components electronically integrated to achieve new levels of performance and efficiency.

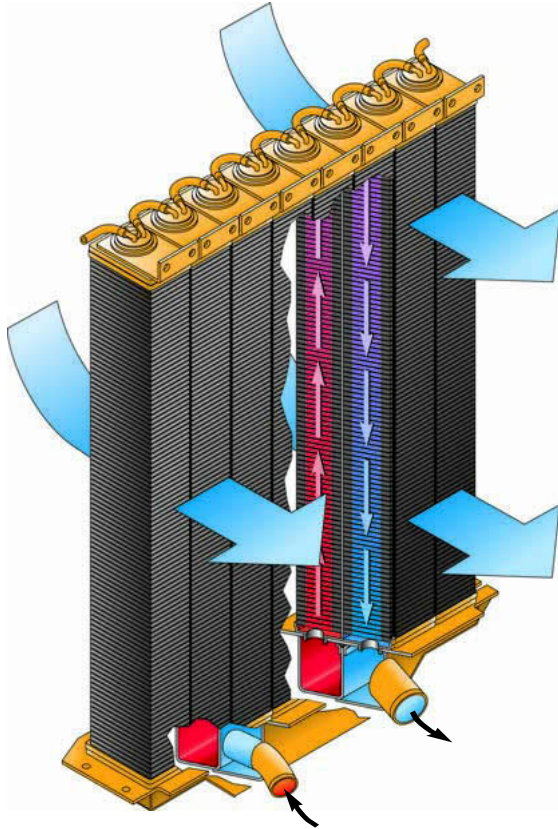
- Eight forward and one reverse speed.
- Gears one and two operate in converter drive for increased torque capability during cut and fill operations.
- Gears three through eight operate in direct-drive for drivetrain efficiency during the haul and return.
- Reverse gear operates in converter drive.

Retarder. Reduces wear on the service brakes and enhances machine control. The hydraulic retarder is internal to the power train and acts as an internal brake when going down a grade. It is engaged before going down a grade.



Advanced Modular Cooling System (AMOCS)

Caterpillar exclusive technology improves serviceability and cooling capability.



Basic Construction. A modular design radiator that is less prone to plugging due to a lower fin density of nine fins per inch versus thirty-three of the previous folded core radiator.

Improved Serviceability. Modular design allows one module to be replaced instead of replacing the entire radiator.

- Shunt tank incorporates a sight gauge for quick, accurate checks of coolant level.
- No longer necessary to remove the top tank to swap out modules.
- Unique service tool facilitates core removal and allows one-person service job.

Increased Performance. Dual stage coolant flow process improves cooling capability by allowing coolant to pass on the air side of the radiator as well as the fan side. The coolant travels:

- Into the air side of the bottom tank;
- Up the air side of the core;
- Down the fan side of the core;
- To the fan side of the bottom tank;
- Then back to the engine.

Scraper Bowl

Designed for optimum loading, material retention and ejection.



Low-profile Design. Offers less resistance to incoming materials.

Cat Bulldozer Ejection. System combines constant spreading control while minimizing carryback material.

Overflow Guard. Optional attachment, helps retain material and keep it from spilling over onto the rear of the scraper.

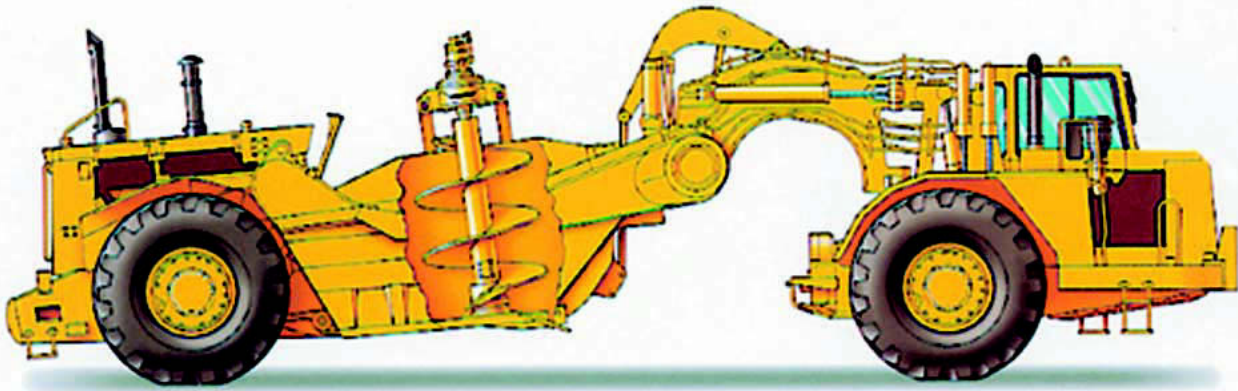
Cellular Construction. Adds strength and dent resistance to bowl sides and floor.

Cutting Edge. May be adjusted according to job conditions. The stinger (drop down) position provides good penetration and efficient flow of material into the bowl while the level cutting edge is used for finish work. For efficient loading the thinnest edge that provides satisfactory wear life should be used.

Caterpillar Ground Engaging Tools (G.E.T.). To optimize scraper loading in various materials a wide range of G.E.T. are available.

Auger Arrangement

Excellent self-loading capability in a wide range of material. Optional attachment available for the 631G and the 637G.



Material Application. Work alone capability with a wide material appetite ranging from overburden to laminated rock. Conditions material which promotes compaction in the fill and significantly reduces dust during loading.

Dual Horsepower. Provides increased power to the auger for improved loading performance.

Auger Mechanism. The auger lifts material off of the cutting edge for true self-loading capability. Material is distributed evenly throughout the bowl, resulting in consistent loads.

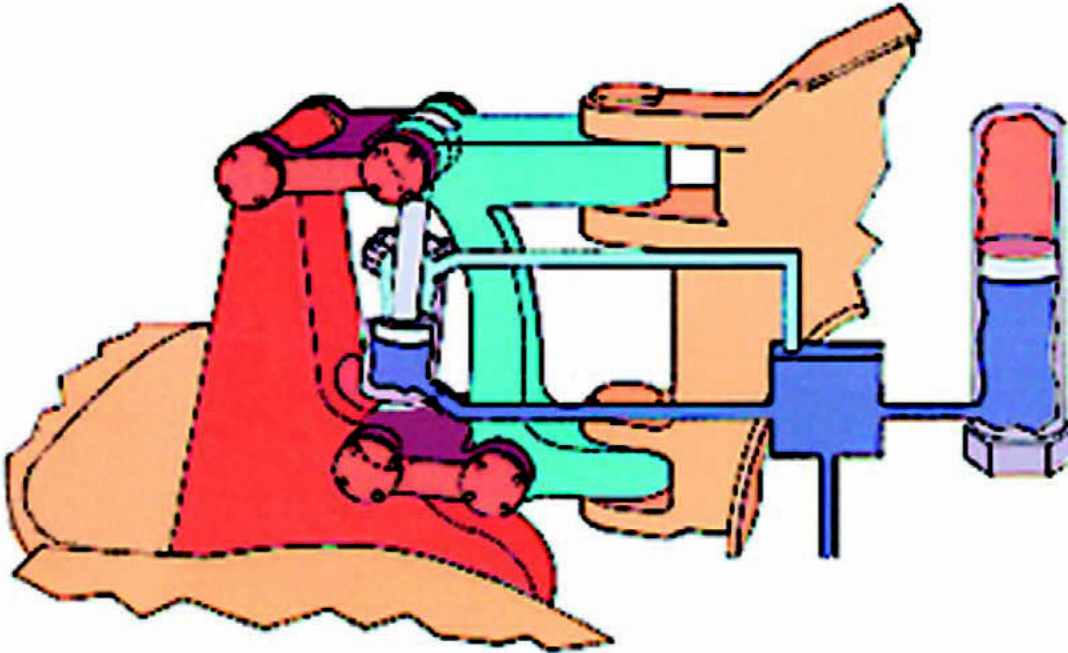
Apron. Prevents material spillage and retains fine material far better than an elevating scraper.

Additional Auger Features. Caterpillar design provides top performance.

- Two-speed auger motor shifts automatically from high speed to low speed to enhance loading capability.
- Dual horsepower tractor engine automatically reverts to the higher setting when the auger motor is engaged.
- Single hydraulic system for entire machine with separate implement pumps and valves.

Electronically Controlled Cushion Hitch

Delivers a smoother ride for enhanced operator comfort.



Cushion Hitch. Electrically actuated hydraulic damper absorbs haul road shocks for increased operator comfort.

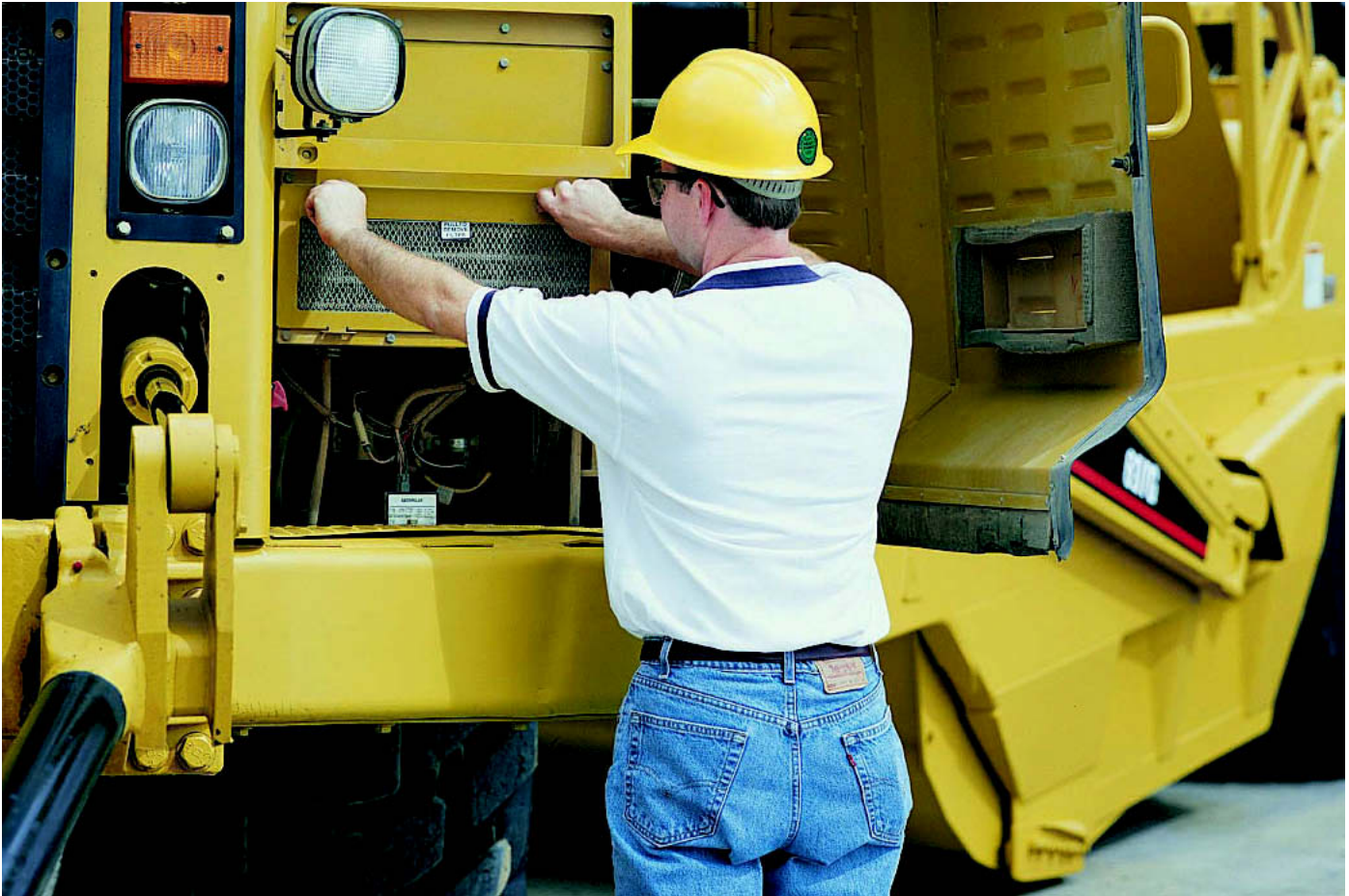
Cushion Hitch Features. Designed for precise control.

- Can be locked down when loading or spreading.
- Vertically mounted hydraulic cylinder transfers road shocks to nitrogen accumulators.
- Controlled oil flow dampens rebound oscillation.
- Leveling valve automatically centers piston in cylinder for all loads.
- Extensive use of steel castings eliminates many welded joints, and increases strength.
- Double-kingbolt design withstands high external forces and enhances installation and removal.

Steering. Full hydraulic power steering provides automotive feel with positive, modulated flow control for constant steering response.

Serviceability

Simplified service means more productive uptime.



Service Points. Service points for the engine are grouped on the right-hand-side for easy access.

Floor Rollers. Sealed floor rollers eliminate lubrication.

Electro-Hydraulic Control. Simplifies serviceability by removing the cab pilot valve and associated line from the cab, which provides increased cab space and reduces noise. The high efficiency electro-hydraulic pilot oil filter provides cleaner oil for the pilot system.

Wiring Harness. Incorporates color-coded and numbered circuits for quick identification and simplified troubleshooting.

Cantilever Wheels. Provide greater parts commonality and ease of serviceability to the wheels and brakes.

Electronic Monitoring System (EMS). Monitors the machine status and provides real-time information to the operator including warnings of problems identified by the Electronic Control Modules.

Engine

Engine Model	3408E	
Net Power - Gears 1-2	336 kW	450 hp
Net Power - Gears 3-8	365 kW	490 hp
Gross Power - Gears 1-2	358 kW	480 hp
Gross Power - Gears 3-8	384 kW	515 hp
Caterpillar Net Power	365 kW	490 hp
ISO 9249	365 kW	490 hp
EEC 80/1269	365 kW	490 hp
SAE J1349	365 kW	490 hp
Bore	137 mm	5.4 in
Stroke	152 mm	6 in
Displacement	18 L	1,099 in ³

- Ratings at 2000 rpm

Scraper Bowl

Heaped Capacity, SAE Rated	23.7 m ³	31 yd ³
Rated Payload	34 020 kg	75,000 lb
Struck Capacity, SAE Rated	16.1 m ³	21 yd ³
Maximum Depth of Cut	437 mm	17 in
Width of Cut, Outside Router Bits	3512 mm	11.5 in
Maximum Ground Clearance	545 mm	21 in
Thickness of Optional Cutting Edge	42 mm	1.62 in
Maximum Hydraulic Penetration Force	255 kN	57,375 lb
Maximum Depth of Spread	480 mm	18.9 in
Apron Opening	2007 mm	79 in
Apron Closure Force	170 kN	38,250 lb

Weights

Total Shipping	45 362 kg	100,006 lb
Tractor Shipping	20 866 kg	46,002 lb
Scraper Shipping	24 496 kg	54,004 lb
Total Operating - Empty	46 475 kg	102,460 lb
Front Axle	31 138 kg	68,648 lb
Rear Axle	15 337 kg	33,812 lb
Total Operating - Loaded	80 495 kg	177,460 lb
Front Axle	42 662 kg	94,054 lb
Rear Axle	37 833 kg	83,406 lb

Transmission

1 Forward	4.7 kph	2.9 mph
2 Forward	8.4 kph	5.2 mph
3 Forward	11.9 kph	7.4 mph
4 Forward	16.1 kph	10 mph
5 Forward	21.6 kph	13.4 mph
6 Forward	29.3 kph	18.2 mph
7 Forward	39.4 kph	24.5 mph
8 Forward	53.5 kph	33.2 mph
Reverse	9.9 kph	6.2 mph

Steering

Width Required for Curb-to-Curb 180 Degree Turn	12.2 m	40.08 ft
Steering Angle - Right	90 Degrees	
Steering Angle - Left	85 Degrees	
Hydraulic Output	370 L/min	96.2 gal/min
Ground-Driven Secondary Steering System	192 L/min	51 gal/min

- Ratings at 2000 rpm

Service Refill Capacities

Fuel Tank	814 L	215 gal
Crankcase	45 L	11.7 gal
Transmission	127 L	33 gal
Differential	136 L	36 gal
Final Drive (each side)	25 L	7 gal
Cooling System	122 L	32 gal
Hydraulic Reservoir	190 L	50 gal
Wheel Coolant (each)	75 L	19.5 gal
Windshield Washer	1.5 L	6 gal

Hydraulics

Bowl Cylinder Bore	184 mm	7.2 in
Bowl Cylinder Stroke	813 mm	34.4 in
Apron Cylinder Bore	210 mm	8.2 in
Apron Cylinder Stroke	727 mm	28.6 in
Ejector Cylinder Bore	210 mm	8.2 in
Ejector Cylinder Stroke	1880 mm	74 in
Steering Circuit	389 L/min	103 gal/min
Scraper Circuit	344 L/min	91 gal/min
Cushion Hitch Circuit	34.5 L/min	9 gal/min
Optional Supplemental Steering Circuit	291 L/min	77 gal/min
Relief Valve Setting - Steering Circuit	13 700 kPa	1,987 psi
Relief Valve Setting - Implement Circuit	14 000 kPa	2,030 psi
Compensator Setting - Cushion Hitch Circuit	16 000 kPa	2,320 psi

Standards

Cab	Meets ANSI, SAE
ROPS/FOPS	Meets SAE, ISO
Brakes	Meets ISO

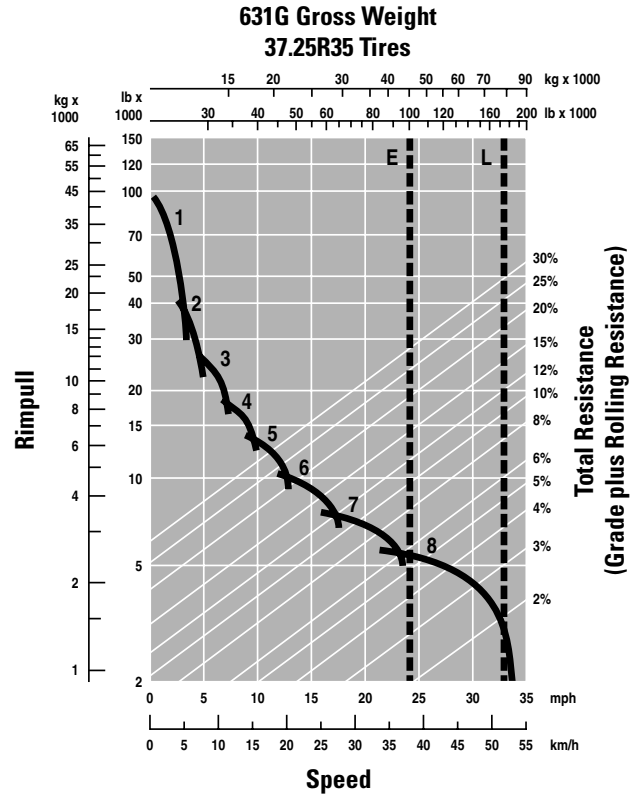
- The operator sound exposure Leq (equivalent sound pressure level) measured according to the work cycle procedures specified in ANSI/SAE J1166 OCT 98 is 81 dB(A), for cab offered by Caterpillar, when properly installed and maintained and tested with the doors and windows closed. Hearing protection may be needed when operating with an open operator station and cab (when not properly maintained or doors/windows open) for extended periods or in noisy environment.
- The exterior sound pressure level for the standard machine measured at a distance of 15 meters according to the test procedures specified in SAE J88 JUN 86, mid-gear-moving operation, is 84 dB(A).
- Standard air conditioning system contains R134a refrigerant.
- ROPS (Rollover Protective Structure) meets SAE J320a, SAE J1040 MAY 94, and ISO 3471-1994.
- FOPS (Falling Object Protective Structure) meets SAE J231 JAN 81 and ISO 3449-1992.
- Brakes meet ISO 3450: 1996 standard.

Gradeability/Speed/Rimpull

To determine gradeability performance:
 Read from gross weight down to the percent of total resistance. Total resistance equals actual percent grade plus 1% for each 9 kg/t (20 lb/ton) of rolling resistance. From this weight-resistance point, read horizontally to the curve with the highest obtainable gear, then down to maximum speed. Usable rimpull will depend upon traction available and weight on drive wheels.

- 1— 1st Gear Torque Converter Drive
- 2— 2nd Gear Torque Converter Drive
- 3— 3rd Gear Direct Drive
- 4— 4th Gear Direct Drive
- 5— 5th Gear Direct Drive
- 6— 6th Gear Direct Drive
- 7— 7th Gear Direct Drive
- 8— 8th Gear Direct Drive

E— Empty 46 475 kg (102,460 lb)
 L— Loaded 80 495 kg (177,460 lb)

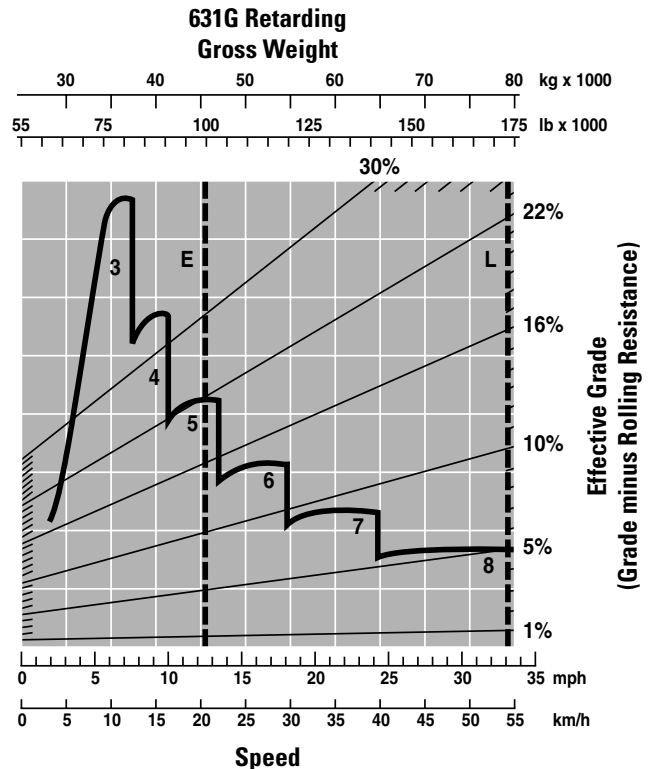


Retarding

To determine retarding performance:
 Read from gross weight down to the percent effective grade. (Effective grade equals actual percent grade minus 1% for each 9 kg/t (20 lb/ton) of rolling resistance). From this weight-effective grade point, read horizontally to the curve with the highest obtainable speed range, then down to maximum descent speed the retarder can properly handle.

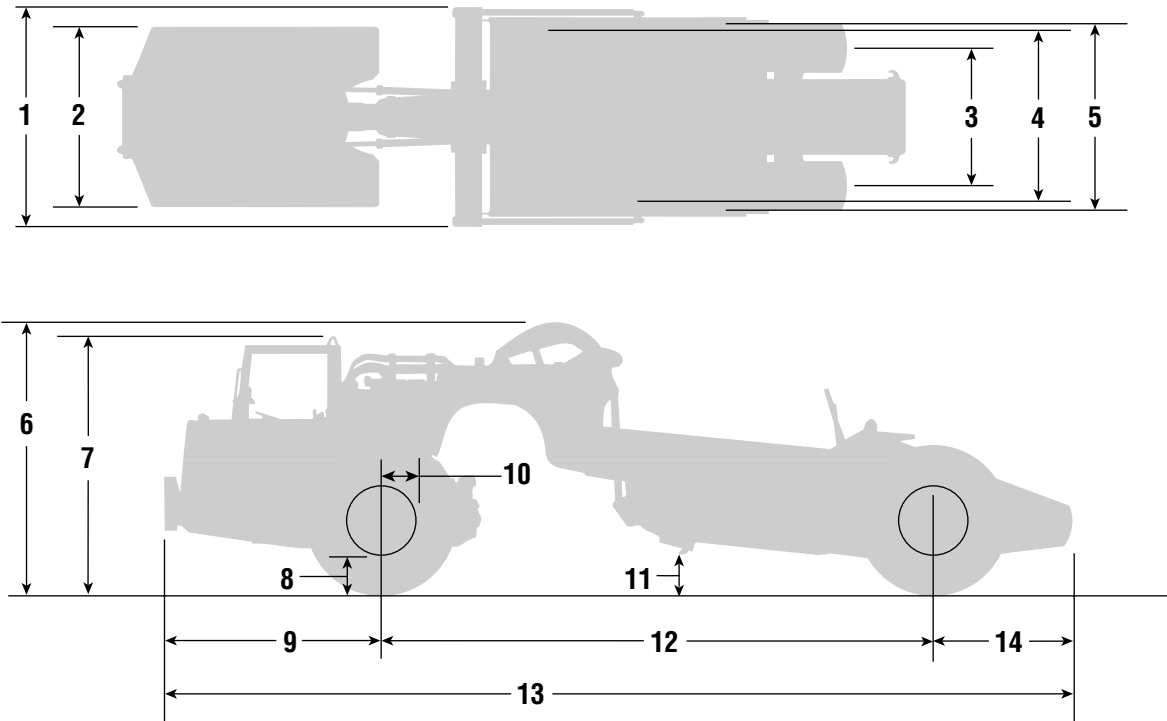
- 3— 3rd Gear Direct Drive
- 4— 4th Gear Direct Drive
- 5— 5th Gear Direct Drive
- 6— 6th Gear Direct Drive
- 7— 7th Gear Direct Drive
- 8— 8th Gear Direct Drive

E— Empty 46 475 kg (102,460 lb)
 L— Loaded 80 495 kg (177,460 lb)



Dimensions

All dimensions are approximate.



Dimensions	631G	
1 Overall machine width	3938 mm	12'11"
2 Tractor width	3481 mm	11'5"
3 Width to center of rear tires	2464 mm	8'1"
4 Width to inside of bowl	3405 mm	11'2"
5 Width to outside of tires	3636 mm	11'11"
6 Overall shipping height	4286 mm	14'1"
7 Height to top of cab	3715 mm	12'2"
8 Tractor ground clearance	665 mm	2'2"
9 Length from front axle to front	3359 mm	11'0"
10 Axle to vertical hitch pin	548 mm	1'10"
11 Maximum scraper blade height	545 mm	1'9"
12 Wheelbase	8769 mm	28'9"
13 Overall machine length	14 565 mm	47'9"
14 Length from rear axle to rear	2437 mm	8'0"

Standard Equipment

Standard equipment may vary. Consult your Caterpillar dealer for specifics.

Electrical

- Alarm, Backup
- Alternator, 75 amp - Tractor Engine
- Batteries (4), 12V Maintenance Free, High Output
- Electrical System, 24V
- Lighting System - (directional signals, hazard lights, halogen headlights with dimmer, cutting edge floodlight)
- Starting Receptacle - Tractor Engine

Operator Environment

- Air Conditioner (includes heater and defroster)
- Cigarette Lighter and Ashtray
- Coat Hook
- Diagnostic Connection Port (12V)
- Dome Courtesy Light

Gauge Group

- Actual Transmission Gear Indicator
- Coolant Temperature
- Electronic Monitoring System (EMS II)
- Fuel Gauge
- Speedometer
- System Air Pressure
- Tachometer
- Transmission/Torque Converter Oil Temperature

Horn

- Implement Control Joystick
- Radio Ready (two radio openings, speakers, and 5-amp converter)
- Rearview Mirrors
- ROPS Cab - Sound Suppression and Pressurization
- Static Seatbelt - Seat Mounted
- Seat, Cloth with Air Suspension
- Steering Wheel - Tilt and Telescoping
- Storage Compartment
- Throttle Lock
- Transmission Hold
- Windows - Sliding Side
- Windshield - Laminated Glass
- Windshield Wiper/Washer - Front and Rear

Power Train

- 3408E Diesel Engine
- Guard, Crankcase
- HEUI™ Fuel System
- 8-speed Automatic Powershift Transmission
- Control Throttle Shifting
- Differential-Lockup
- Downshift Inhibitor
- Neutral Coast Inhibitor
- Programmable Top-Gear Selection
- Retarder, Hydraulic

Power Train Features

- Air Cleaner, Dry Type with Pre-cleaner
- Braking System
- Parking / Primary / Secondary
- Shields - Brake
- Electric Start, 24V
- Fan, Suction
- Ground Level Engine Shutdown
- Muffler
- Starting Aid, Ether

Other Standard Equipment

- Advanced Modular Cooling System (AMOCS) Radiator
- Air Dryer
- Engine Door, Right Side
- Extended Life Coolant, -36°C (-33°F)
- Fast Oil Change
- Fenders, Tractor
- Product Link Ready
- Tires, 37.25-R35 Radial ** E3
- Tow Pins
- Thermo-Shield, Laminated

Optional Equipment

Optional equipment may vary. Consult your Caterpillar dealer for specifics.

Tractor

- Coolant, Extended Life -50°C (-58°F)
- Cooler, Hydraulic Oil
- Guard, Crankcase Heavy Duty
- Guard, Power Train
- Heater, Engine Coolant, 120 V
- Lights, Side Vision
- Rear Auxiliary Defrost Fan
- Retarder, Hydraulic
- Seat Belt, Retractable
- Secondary Steering

Special Arrangements

- Standard Bowl with Auger

Scraper

- Guard, Overflow
- Fast Fuel System
- Fenders
- Liner, Bowl

Notes

Notes

631G Wheel Tractor-Scraper

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Materials and specifications are subject to change without notice.
Featured machines in photos may include additional equipment.
See your Caterpillar dealer for available options.

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